

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/27608

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : H01L 31/0272, 31/04, 31/072
 US CL : 136/262, 264, 265; 438/93, 94, 95

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 136/262, 264, 265; 438/93, 94, 95

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|---|-----------------------|
| X | DELAHOY et al. Charging and Discharging of Defect States in CIGS/ZnO Junctions. Thin Solid Films. 2000, Vol. 361-362, pages 140-144, especially page 361. | 18, 19 |
| A | | 1-17 |
| X | YAMADA et al. 'Buried pn Homojunction in Cu(InGa)Se2 Solar Cells Formed by Intentional Zn Doping.' In: Conference Record of the 28th Photovoltaic Specialists Conference. IEEE, 15-22 September 2000, pages 462-465, especially page 462. | 18, 19 |
| A | | 1-17 |
| X | NISHIWAKI et al. Preparation of Zn Doped Cu(In,Ga)Se2 Thin Films by Physical Vapor Deposition for Solar Cells. Solar Energy Materials & Solar Cells. 01 June 2003, Vol. 77, No. 4, pages 359-368, especially pages 360-361. | 18, 19 |
| A | | 1-17 |
| X | RAMANATHAN et al. 'Surface Treatment of CuInGaSe2 Thin Films and Its Effect on the Photovoltaic Properties of Solar Cells.' In: National Renewable Energy Laboratory conference paper preprint. NREL: Colorado, October 2002, pages 1-6, especially page 1. | 18, 19 |
| A | | 1-17 |

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

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"E" earlier application or patent published on or after the international filing date

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"O" document referring to an oral disclosure, use, exhibition or other means

"&" document member of the same patent family

"P" document published prior to the international filing date but later than the priority date claimed

Date of the actual completion of the international search

19 April 2004 (19.04.2004)

Date of mailing of the international search report

07 MAY 2004

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INTERNATIONAL SEARCH REPORT

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| X | US 6,346,184 B1 (SANO et al) 12 February 2002 (12.02.2002), examples 16 at column 19. | 18, 19 |
| --- | | ----- |
| A | TERHEGGGEN et al. Ga ₂ O ₃ Segregation in Cu(In, Ga)Se ₂ /ZnO Superstrate Solar Cells and its Impact on their Photovoltaic Properties. Thin Solid Films. 2002, Vol. 403-404, pages 212-215. | 1-17 |
| | | 1-19 |

**Declarations under Rule 4.17:**

- *as to the identity of the inventor (Rule 4.17(i)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY,*

CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

- *of inventorship (Rule 4.17(iv)) for US only*

Published:

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